Prevention of Lyme Disease Complications in Agency Employees

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Kevin Conrad
PASS National Safety Representative

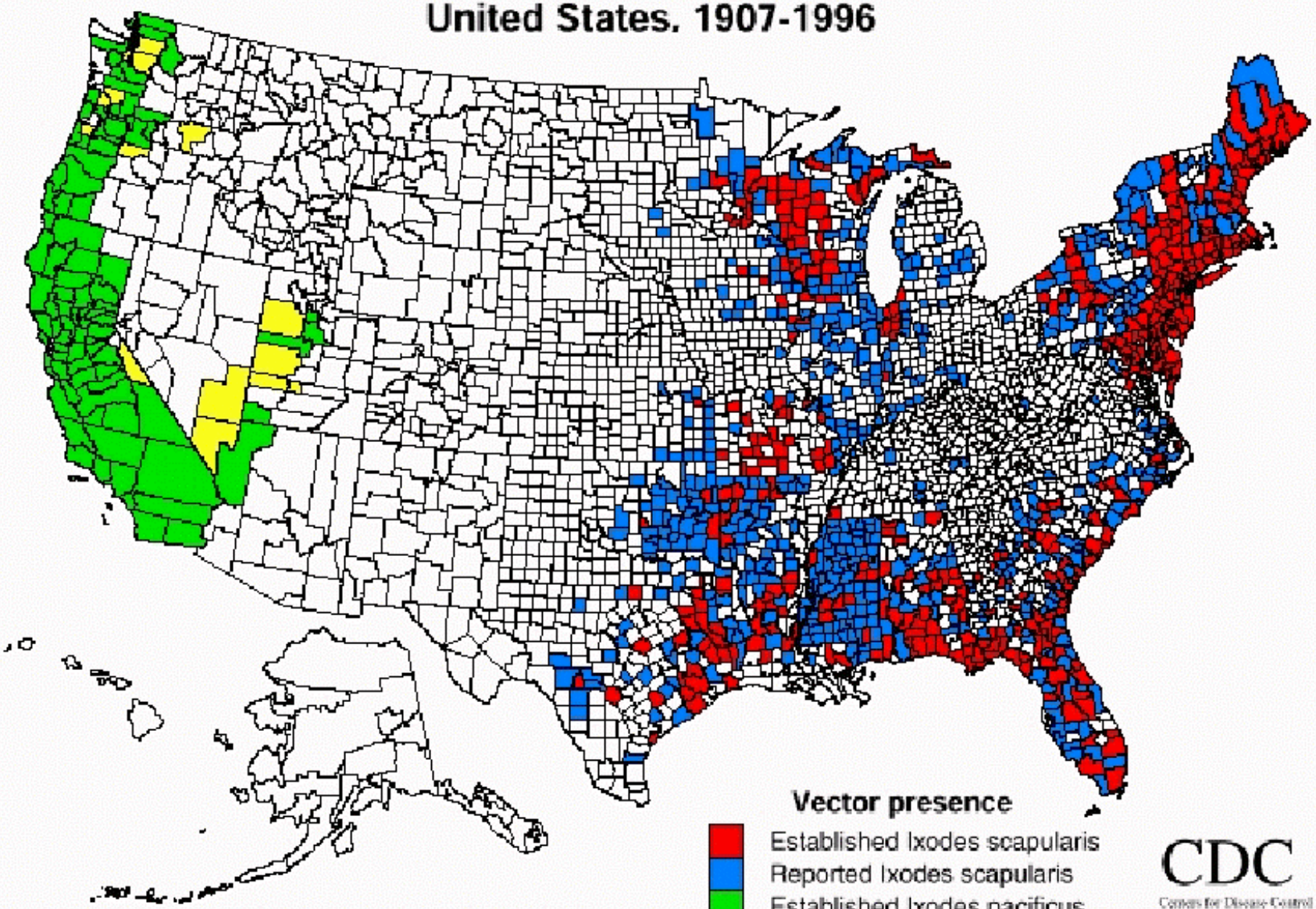
Steve Schwendeman, M.D., M.S.
Occupational Health Division, AAM-700

Center for Disease Control & Prevention (CDC) Has Reported

- Lyme is the most common reported tick-borne illness in the US
- Annual reported US cases increased 25-fold since 1982
- Approximately 12,500 cases are reported annually, and the actual number of cases may be higher
- Reported cases have occurred in Alaska, Hawaii, and Guam
- Areas at increased risk include:
  - Wisconsin, Minnesota (Midwest)
  - Northern California and Oregon (Northwest)
  - Massachusetts to Maryland (Northeast /Atlantic seaboard)

Lyme Is Transmitted by Deer or Western Black-legged Ticks

Established* and reported** distribution of the Lyme disease vectors Ixodes scapularis (I. dammini) and Ixodes pacificus, by county, United States, 1907-1996



CDC
Centers for Disease Control and Prevention

*at least 6 ticks or 2 life stages (larvae, nymphs, adults) identified.
**at least 1 tick identified.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How Can the Health of Agency Employees Best Be Protected?

- There is broad agreement on the importance of appropriately reducing exposures to ticks and the potential complications associated with Lyme disease
  - **Appropriate facility maintenance to reduce tick populations**
  - **Good work procedures to reduce tick exposure**
  - **Proper clothing and chemical repellents to reduce tick exposure**
  - **Timely skin inspection and tic removal, to reduce exposure to Borrelia burgdorferi**
  - **Prompt medical evaluation of rashes / suspected illness**

How Can the Health of Agency Employees Best Be Protected?

- There is disagreement on whether the agency should reimburse for LYMErix
- The ANE OSHECCOM has recommended that the agency reimburse employees for LYMErix
- PASS is negotiating a MOA with the agency which includes employee reimbursement for LYMErix
- The Occupational Health Division (AAM-700) does not recommend LYMErix, and urges the agency to not provide reimbursement. (Employees may wish to discuss with their personal physician.)

Good Maintenance Can Reduce Tick Populations

- Clear tall grass, woodpiles, and overgrown vegetation around agency facilities
- Increase the amount of sunlight to shady areas by trimming or the cutting down of brush and tree limbs

Good Work Procedures Can Reduce Tick Exposure

- Reduce unnecessary entrance into areas of potential tick infestation, such as:
  - locations with overgrown vegetation,
  - shady humid areas, such as the woods, or
  - areas with tall grass.
- Reduce outdoor activities in high risk areas during the Spring through in Summer months when ticks actively feed.

Personal Clothing and Chemical Repellants Can Reduce Tick Exposure

- Wear light colored clothing and long-sleeve shirts
- Avoid low-cut footwear (high top boots are preferred)
- Tuck pants into boots or socks
- Apply repellents containing DEET (n,n-diethyl-m-toluamide) to clothing and exposed skin, or permethrin to clothing only

Timely Skin Inspection & Correct Tick Removal Can Reduce Exposure to Lyme Bacteria

- Check skin daily for ticks
- Personal inspection of entire body upon leaving areas of risk
- B. burgdorferi transmission from an infected tick is unlikely to occur before 36 hours of tick attachment
- Use proper tick removal technique
  - Do not apply chemicals / heat
  - Grasp the tick close to skin, and directly withdraw
  - Wash area with soap and water

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Occurrence of Severe Destructive Lyme Arthritis in Hamsters Vaccinated with Outer Surface Protein A and Challenged with *Borrelia burgdorferi*

CINDY L. CROKE,[1,2] ERIK L. MUNSON,[1,2] STEVEN D. LOVRICH,[3] JOHN A. CHRISTOPHERSON,[1,2] MONICA C. REMINGTON,[1,2] DOUGLAS M. ENGLAND,[4,5] STEVEN M. CALLISTER,[5,6] AND RONALD F. SCHELL[1,2,7]*

Wisconsin State Laboratory of Hygiene[1] and Departments of Medical Microbiology and Immunology,[2] Bacteriology,[7] and Pathology and Laboratory Medicine,[4] University of Wisconsin, Madison, Wisconsin 53706; Department of Pathology, Mercer Hospital, Madison, Wisconsin 53715[3]; and Microbiology Research Laboratory[5] and Section of Infectious Diseases,[6] Gundersen Lutheran Medical Center, La Crosse, Wisconsin 54601

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Arthritis is a frequent and major complication of infection with *Borrelia burgdorferi* sensu stricto. The antigens responsible for the induction of arthritis are unknown. Here we provide direct evidence that a major surface protein, outer surface protein A (OspA), can induce arthritis. Hamsters were vaccinated with 30, 60, or 120 μg of recombinant OspA (rOspA) in aluminum hydroxide and challenged with *B. burgdorferi* sensu stricto isolate 297 or C-1-11. Swelling of the hind paws was detected in 100, 100, and 50% of hamsters vaccinated with 30, 60, or 120 μg of rOspA, respectively. In addition, arthritis developed in 57% of hamsters vaccinated with a canine rOspA vaccine after infection with *B. burgdorferi* sensu stricto. When the canine rOspA vaccine was combined with aluminum hydroxide, all vaccinated hamsters developed arthritis after challenge with *B. burgdorferi* sensu stricto. Histopathologic examination confirmed the development of severe destructive arthritis in rOspA-vaccinated hamsters challenged with *B. burgdorferi* sensu stricto. These findings suggest that rOspA vaccines should be modified to eliminate epitopes of OspA responsible for the induction of arthritis. Our results are important because an rOspA vaccine in aluminum hydroxide was approved by the Food and Drug Administration for use in humans.

Arthritis is the most frequent and the major complication of tick-borne transmission of *Borrelia burgdorferi* sensu stricto (*B. burgdorferi*) (31). Approximately 60% of individuals develop intermittent episodes of arthritis several weeks or months after infection. The brief attacks of arthritis last several days or weeks and generally occur in the larger joints (31, 32). In addition, 10% of arthritogenic patients develop antibiotic-resistant Lyme arthritis (12, 14), which can lead to permanent

Recently, the Food and Drug Administration (FDA) approved the use of OspA for vaccination of humans despite indirect evidence and concerns that OspA is associated with arthritis (1, 12, 29, 30). In this study, we present direct evidence that vaccination with two preparations of recombinant OspA (rOspA) can induce severe destructive arthritis in hamsters after challenge with the Lyme borreliosis spirochete.

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Advisory Committee on Immunization Practices (ACIP)

- “Lyme disease vaccination may be considered for persons aged 15-70 years who are exposed to tick-infested habitat but whose exposure is neither frequent nor prolonged. The benefit of vaccination beyond that provided by basic personal protection and early diagnosis and treatment of infection is uncertain.”

Federal Agency Policies Regarding LYMErix

- Not specifically required by OSHA regulations
- No existing NIOSH guidance
- The United States Postal Service (largest US employer), does not provide Lyme vaccinations
- NASA does not provide Lyme vaccinations
- DOD will pay for vaccinations in selected employees
- The US Forest Service (within DOA) does not routinely provide LYMErix to employees, but may consider based on Job Hazard Analysis

LYMErix

- Little long term experience
- May trigger an auto-immune arthritis
- Does not prevent other tick borne disease
- Not 100% effective in preventing Lyme
- $60 per dose
- Three dose primary series (0, 1, & 12 months)
- Recurrent boosters may be required

Antibiotics After Tick Bites?

- The risk-benefit ratio of antibiotics after tick bites is dependent on the probability of infection
  - Most physicians do not recommend antibiotics for tick bite alone
  - Antibiotics may be appropriate when a tick is likely to have been in place for more than 24 hours

Occupational Medicine Perspective Regarding LYMErix

- The potential induction of irreversible auto-immune arthritis is a major concern.
- It is possible that LYMErix may ultimately become the most common cause of Lyme related complications.
- Currently AHR reports that there is only one agency OWCP claim related to Lyme disease
- If the agency provides incentives for employees to obtain LYMErix, then vaccine linked complications will likely raise Lyme related OWCP costs
- Efficacy is not 100%, and the benefit is not clear for moderate to low risk populations
- Will not prevent other tick borne illness

Joint PASS & Occupational Medicine Recommendations

- Agency employees should continue to be educated in methods of reducing Lyme disease complications
- The agency should ensure that facility grounds maintenance is consistent with known methods of reducing tick populations
- Employees who have potential exposures to ticks should use proper dress and chemical repellants
- Employees who have potential exposures to ticks should carefully inspect their skin when leaving an area of tick infestation, and at the end of each day, and remove ticks
- Employees with a rash, or other symptoms, should seek medical attention

PASS Recommendation

- The agency should reimburse certain employees who choose to obtain LYMErix from their private physicians

Occupational Medicine Recommendations

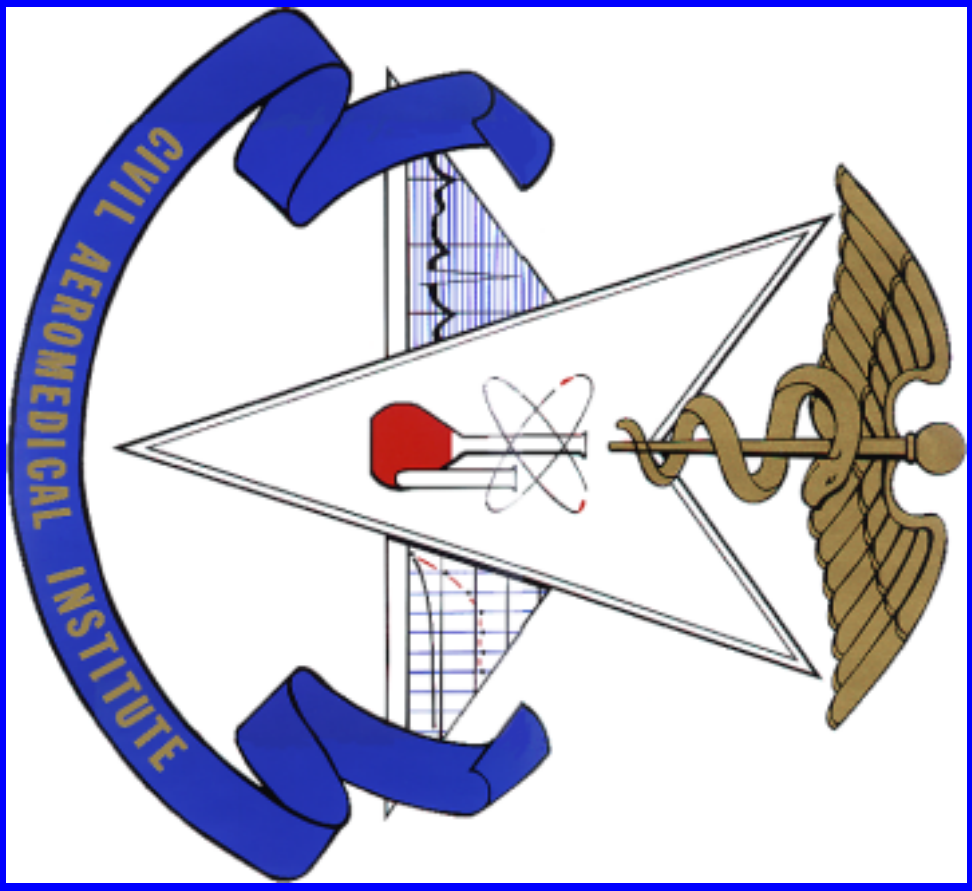
- LYMErix is not currently recommended for agency employees.
  - ***The reported cumulative incidence of occupational Lyme is low.***
  - ***LYMErix may have potential to induce persistent autoimmune arthritis.***
  - ***Additional information is needed.***
  - ***A safer vaccine may be available in the near term future.***
- The agency should not reimburse employees for LYMErix.
  - ***Current information is inadequate to justify what is in fact, a public health policy.***
  - ***Agency provision of LYMErix vaccine may raise OWCP costs.***
  - ***LYMErix is less cost effective than other occupational health programs that are not funded.***
- Additional information should be considered when available.

Questions and Comments are Welcome

Thank you!

Kevin Conrad
(800) 393-3206

Steve Schwendeman
(405) 954-3412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